

VEHICLE WHEEL ASSEMBLY AND CLADDING THEREFORE

BACKGROUND OF THE INVENTION

- [0001] The present invention relates to a vehicle wheel assembly and cladding therefore, and in particular to a cladding configuration adaptable for use with a flangeless vehicle wheel.
- [0002] Ornamental outer coverings have been employed for providing a decorative surface to the exposed surface of a vehicle wheel for many years. The use of outer coverings offer design flexibility in various design configurations that may be used to cover a single-style wheel. In certain applications, the ornamental wheel covering is constructed of a polymeric material or plastic that is then coated with a metal plating. U.S. Patent Nos. 5,564,791; 5,577,809; 5,597,213; 5,630,654; 5,636,906; 5,845,973; and 6,085,829, the disclosures of which are incorporated herein by reference, represent different approaches for providing and attaching such claddings to existing wheels to provide a decorative appearing wheel.
- [0003] Heretofore, stainless steel has been used in a wide variety of outer coverings due to corrosion resistance, relative cost, and the flexibility it offers in the design of the associated coverings. Similarly, preferred materials such as steel and aluminum have been used in a wide variety of vehicle wheel designs due to the strength, relative cost and adaptability these materials offer. However, previous designs of these outer coverings and vehicle wheels require significant expenditure during manufacture in order to incorporate certain details. Specifically, previous wheel designs require the

casting of complex geometries and/or significant machining in order to form certain details such as the wheel flange.

[0004] Therefore, a vehicle wheel assembly is desired that includes a cladding that is adaptable to be used with steel or aluminum wheels that do not include an integrally-forged, casted and/or machined outer flange. Further, these claddings should be long-lasting, corrosion resistant, relatively inexpensive to manufacture, and relatively easy to form into required configurations.

SUMMARY OF THE INVENTION

[0005] One aspect of the present invention is to provide a wheel assembly that includes a wheel having a disk and a rim complementary to the disk, wherein the disk and the rim include an outer surface, and wherein the rim includes an outer edge extending circumferentially about the rim. The wheel assembly also includes a ring-shaped flange member, and a wheel cladding member having a central portion and an outer periphery complementary to the central portion, wherein the outer periphery includes a circumferentially-extending channel that receives the flange member therein. The cladding member is operably coupled to the wheel such that the central portion of the cladding member is aligned with at least a portion of the disk of the wheel, the periphery of the cladding member is aligned with at least a portion of the rim of the wheel, and the channel of the wheel cladding is located substantially proximate to the outer edge of the rim.

[0006] Another aspect of the present invention is to provide a wheel cover assembly adapted to cover a vehicle wheel having a disk and a rim complementary to the disk, wherein the disk and the rim each include an outer surface, and wherein the rim

includes an outer edge extending circumferentially about the rim. The wheel cover assembly includes a ring-shaped flange member, and a wheel cladding member having a central portion and a outer periphery complementary to the central portion, wherein the outer periphery includes a circumferentially-extending channel that receives the flange portion therein. The cladding member is adapted to be coupled to the vehicle such that the cladding member is aligned with at least a portion of the disk of the wheel, the periphery of the cladding member is aligned with at least a portion of the rim of the wheel, and the flange member is adapted to be located substantially proximate the outer edge of the rim.

[0007] Yet another aspect of the present invention is to provide a method for assembling a wheel cover assembly with a vehicle wheel to form a wheel assembly that includes providing a wheel cladding member having a central portion and an outer periphery complementary to the central portion, wherein the outer periphery includes a circumferentially-extending channel. The method also includes providing a ring-shaped flange member, and locating the flange member within the channel of the cladding member. The method further includes providing a vehicle wheel having a disk and a rim complementary to the disk, wherein the disk and the rim include an outer surface, and wherein the rim includes an outer edge extending circumferentially about the rim, and coupling the cladding member with the wheel such that the central portion of the cladding member is aligned with at least a portion of the disk of the wheel, the periphery of the cladding member is aligned with at least a portion of the rim of the wheel, and the channel of the cladding member is located substantially proximate the outer edge of the rim.

[0008] Still yet another aspect of the present invention is to provide a wheel assembly that includes a wheel having a disk and a rim complementary to the disk, wherein the disk and the rim include an outer surface, and wherein the rim includes an outer edge extending circumferentially about the rim. The wheel assembly also includes a wheel cladding member having a central portion and an outer periphery complementary to the central portion and a lip portion complementary to the outer periphery, wherein the lip portion folds back substantially against the outer periphery, thereby creating a flangeless hem extending circumferentially about the wheel cladding. The cladding member is operably coupled to the wheel such that the central portion of the cladding member is aligned with at least a portion of the disk of the wheel, and the periphery of the wheel member is aligned with at least a portion of the rim of the wheel.

[0009] Another aspect of the present invention is to provide a wheel cladding adapted to cover a vehicle wheel having a disk and a rim complementary to the disk, wherein the disk and the rim include an outer surface, and wherein the rim includes an outer edge extending circumferentially about the rim. The wheel cladding includes a central portion, an outer periphery complementary to the central portion, and a lip portion complementary to the outer periphery, wherein the lip portion folds back substantially against the outer periphery, thereby creating a flangeless hem extending circumferentially about the cladding member. The cladding member is adapted to be coupled to a wheel such that the central portion of the cladding member is aligned with at least a portion of a disk of the wheel, and the outer periphery of the cladding member is aligned with at least a portion of a rim of the wheel.

[0010] The present inventive vehicle wheel assembly includes a cladding that is adapted for utilization with an associated vehicle wheel that does not include an outer flange, thereby reducing the costs typically associated with the molding and/or machining processes required to create such a flange. The cladding associated with the vehicle wheel assembly provides an aesthetic outer covering that is long-lasting, corrosion resistant, relatively inexpensive to manufacture, and is particularly well adapted for the proposed use.

[0011] These and other advantages of the invention will be further understood and appreciated by those skilled in the art by reference to the following written specification, claims and appended drawings.

Brief Description of the Drawings

[0012] Fig. 1 is an exploded perspective view of a first embodiment of a vehicle wheel assembly;

[0013] Fig. 2 is a front elevational view of the vehicle wheel assembly;

[0014] Fig. 3 is a cross-sectional view of a disk and rim area of the vehicle wheel assembly, taken through line III-III, Fig. 2;

[0015] Fig. 4A is an exploded cross-sectional view of a flange separated from a wheel cladding taken through line III-III, Fig. 2, with an alternative tab extension shown in dashed line;

[0016] Fig. 4B is a cross-sectional view of the flange inserted into a groove of the wheel cladding, taken through line III-III, Fig. 2 with a tab wrapped about the flange, and the alternative tab extension extending outwardly from the tab;

[0017] Fig. 4C is a cross-sectional view of the flange and the wheel cladding assembled with an associated vehicle wheel, taken through line III-III, Fig. 2; and

[0018] Fig. 5 is a cross-sectional view of a disk and rim area of an alternative embodiment of the vehicle wheel assembly, taken through line III-III, Fig. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] For purposes of description herein, the terms "upper," "lower," "right," "left," "rear," "front," "vertical," "horizontal," and derivatives thereof shall relate to the invention as oriented in Fig. 1. However, it is to be understood that the invention may assume various alternative orientations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification are exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0020] The reference numeral 10 (Figs. 1 and 2) generally designates a vehicle wheel assembly embodying the present invention. In the illustrated example, the wheel assembly 10 includes a vehicle wheel 12 having a central disk 14 and a rim 16 complementary to the disk 14. The disk 14 and the rim 16 include an outer surface 18. The rim 16 includes an outer edge 20 extending circumferentially about the rim 16. The wheel assembly 10 also includes a ring-shaped flange member 22, and a wheel cladding member having a central portion 26 and an outer periphery 28, complementary to the central portion 26. The outer periphery 28 includes a circumferentially-extending

channel that receives the flange member 22 therein. The cladding member 24 is operably coupled to the wheel 12 such that the central portion 26 of the cladding member 24 is aligned with the disk 14 of the wheel 12, the outer periphery 28 of the cladding member 24 is aligned with the rim 16 of the wheel 12, and the channel 30 of the cladding member 24 is located proximate the outer edge 20 of the rim 16. In the illustrated example, the wheel assembly 10 further includes a center cap 32 that is snappably coupled with the cladding member 24, thereby covering a lug nut well 34 of the wheel 12. However, it should be noted that the cladding member 24 may be provided in various configurations, including those that allow for exposed lug nuts subsequent to the cladding member 24 being coupled with the wheel 12, and configurations that do not include the use of a center cap 24.

[0021] The wheel 12 (Fig. 3) is preferably constructed of steel or aluminum, however, other materials suitable for such uses may be utilized. The disk 14 and the rim 16 of the wheel 12 include the outer surface 18 and an inner surface 36. The wheel 12 further includes a circumferentially and outwardly-extending outer tab 38 located proximate the outer edge 20, and an outwardly and circumferentially-extending inner tab 40 located axial inward from the outer tab 38. The outer tab 38 and the inner tab 40 cooperate to form a circumferentially-extending groove 42 located therebetween. While the outer tab 38 and the inner tab 40 are preferably cast-formed within the wheel 12, other techniques may be utilized such as machining, forging, and the like.

[0022] The flange member 22 is provided with a substantially U-shaped cross-sectional configuration, and includes a concave first portion 46 facing inwardly toward the central portion 26 of the cladding member 24 when assembled therewith, and a convex second

portion 48 facing outwardly away from the central portion 26 of the cladding member 24 when the flange member 22 is assembled with the cladding member 24. The flange member 22 further includes an inner surface 50 facing inwardly toward the rim 16 of the wheel 12 when the cladding member 24 and the flange member 22 are assembled with the wheel 12. The inner surface 50 includes a first portion 52 and a second portion 54 offset from one another by an angled shoulder 56.

[0023] The cladding member 24 is preferably constructed of a stainless steel, however, other materials suitable for such application may be utilized therefore. The channel 30 of the cladding member 24 is provided a substantially U-shaped geometrical configuration that closely receives the U-shaped configuration of the flange member 22 therein. Specifically, the channel 30 includes a radially inwardly-located surface 60 extending complimentary to the central portion 26, and an outwardly-located surface 62 extending complimentary to the surface 60. A circumferentially-extending lip portion 58 extends complementary to the surface 62 of the cladding member 24. Alternatively, a lip extension 59 extends complementary to the lip portion 58.

[0024] In assembly, an adhesive 63 (Fig. 4A) is placed within the channel 30 prior to locating the flange member 22 therein. Specifically, the radially-inwardly located surface 60 and the outwardly-located surface 62 of the channel 30 are each coated with the adhesive 63. The flange member 22 (Fig. 4B) is then pressed into the channel 30 of the cladding member 24 such that the first portion 46 of the outer surface 44 and an end portion 64 of the outer surface 44 contact the adhesive 63 as previously placed within the channel 30, thereby adhering the flange member 22 to the surfaces 60, 62 of the channel 30. The lip portion 58 of the cladding member 24 is then rolled or curled

inwardly in a direction as indicated by directional arrow 67, such that the lip portion 58 curls about the curved second portion 48 of the outer surface 44 of the flange member 22, thereby creating a positive lock between the flange member 22 and the cladding member 24. An inner surface 66 of the cladding member 24 and the inner surface 50 of the flange member 22 are then coated with the adhesive 63. The cladding member 24 with the flange member 22 is then pressed onto the associated wheel 12, thereby securely attaching the cladding member 24 and the flange member 22 with the wheel 12. Proper axial alignment of the cladding member 24 and the flange member 22 with respect to the wheel 12 is provided by the shoulder 56 of the cladding member 24 that axially aligns within the outer tab 38 of the wheel 12. Alternatively, the cladding member 24 and the flange member 22 are secured to the wheel 12 prior to rolling or curling the lip portion 58. In this embodiment, the lip portion 58 is curled subsequent to securing the cladding member 24 and the flange member 22 to the wheel 12, such that when the lip portion 58 curls about the curved second portion 48 of the outer surface 44 of the flange member 22, and such that the lip extension 59 curls about the outer edge 20 of the wheel 12, thereby creating a positive lock between the cladding member 24 and the flange member 22, and a positive lock between the cladding member 22 and the wheel 12.

[0025] The reference numeral 10a (Fig. 5) generally designates another embodiment of the present invention. Since the wheel assembly 10a is similar to the previously-described wheel assembly 10, similar parts appearing in Figs. 1-3 and Fig. 5 are represented by the same, corresponding reference numeral, except for the suffix "a" in the numerals of the latter. The cladding member 24a includes a circumferentially-

extending lip 69 complementary to the outer periphery 28a. The lip 69 is turned axially and radially inwardly until an inner surface 68 of the lip 69 contacts an inner surface 70 of the outer periphery 28a, thereby creating a double-thickness hem 72 extending circumferentially about the cladding member 24a and including an outer edge 74. A circumferentially-extending angular shoulder 76 offsets the hem 72 outwardly from a portion of the outer periphery 28a. Specifically, the shoulder 76 preferably offsets the hem 72 from the portion of the outer periphery 28a such that the lip 69 is coplanar with the portion of the outer periphery 28a. Further, the shoulder 72 and the lip 69 are configured so as to provide a gap 82 between a distal end 84 of the lip 69 and the shoulder 72.

[0026] In the illustrated example, the wheel 12a includes a circumferentially and outwardly-extending tab 65 that is radially inset from the outer edge 20a of the wheel 12a.

[0027] In assembly, the inner surface 80 of the cladding member 24a and/or an outer surface 79 of the lip 69 are coated with an adhesive 80. The cladding member 24a is then pressed onto the wheel 12a and adhered thereto by the adhesive 80. The cladding member 24a is radially positioned with respect to the wheel 12a by locating the tab 65 within the gap 82.

[0028] The vehicle wheel assembly as disclosed and described herein includes, among other things, a wheel cover or cladding that is compatible with steel and/or aluminum wheels that do not include forged, cast or machined outer flanges. Moreover, these claddings are preferably constructed of a long-lasting stainless steel or similar alloy, and

are therefore corrosion resistant, relatively inexpensive to manufacture, and are relatively easy to form into required configurations.

[0029] In the foregoing description, it will be readily appreciated by those skilled in the art that modifications may be made to the invention without departing from the concepts disclosed herein. Such modifications are to be considered as included in the following claims, unless these claims by their language expressly state otherwise.